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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/828,324	04/06/2001	Moeness Gamal Amin	SAR 14209	5671

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EXAMINER	
WARE, CICELY Q	

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 10/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/828,324	AMIN ET AL.
	Examiner	Art Unit
	Cicely Ware	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4, 5,6,8, 9,10,12* is/are rejected.

7)☒ Claim(s) *2,7 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 July 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments, see **REMARKS**, filed 7/19/2005 with respect to the rejection(s)of claim(s) 1, 3, 4-6, 8 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Garth (US Patent 6,259,743), Werner et al. (US Patent 6,493,381), Shen (US Patent 5,416,845) and Gevargiz et al. (US Patent 6,301,313). Examiner asserts that the cost function in Garth uses a CAP code, which inherently possesses an amplitude and phase component.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Garth (US Patent 6,259,743).

(1) With regard to claim 1, Garth discloses a method of equalizing a radio frequency (RF) signal comprising: generating a cost function using amplitude and phase components of the output signal of an equalizer (col. 1, lines 19-21, 25-27, col. 3, lines 29-47, 54-56, col. 5, lines 1-34); minimizing said cost function using a gradient recursion

algorithm; and adjusting the tap weights of said equalizer using the result of said gradient recursion algorithm (col. 4, lines 4-65 – col. 5, lines 1-34, col. 7, lines 13-67).

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garth (US Patent 6,259,743) as applied to claim 1, in view of Shen (US Patent 5,416,845).

With regard to claim 3, claim 3 inherits all the limitations of claim 1. However Garth does not disclose wherein said gradient recursion algorithm is defined by the equation w.sub.k+1=w.sub.k-.mu..sub.m.gradient.J.sub.m(w).- vertline.w=w.sub.k, where: w.sub.k+1 is a tap weight vector at the kth+1 instant, w.sub.k is said tap weight vector at the kth instant, .mu..sub.m is the gradient step size, and .gradient.J.sub.m(w) is the gradient of said cost function.

However Shen discloses wherein said gradient recursion algorithm is defined by the equation w.sub.k+1=w.sub.k-.mu..sub.m.gradient.J.sub.m(w).- vertline.w=w.sub.k, where: w.sub.k+1 is a tap weight vector at the kth+1 instant, w.sub.k is said tap weight vector at the kth instant, .mu..sub.m is the gradient step size, and .gradient.J.sub.m(w) is the gradient of said cost function (col. 2, lines 29-44, col. 4, lines 1-40).

Therefore it would have been obvious to one of ordinary skill in the art to modify Garth in view of Shen to incorporate wherein said gradient recursion algorithm is defined by the equation w.sub.k+1=w.sub.k-.mu..sub.m.gradient.J.sub.m(w).- vertline.w=w.sub.k, where: w.sub.k+1 is a tap weight vector at the kth+1 instant, w.sub.k is said tap weight vector at the kth instant, .mu..sub.m is the gradient step size, and

.gradient.J.sub.m(w) is the gradient of said cost function for rapid convergence to ensure short adaptive responses to transient noises (Shen, col. 3, lines 29-31).

5. Claim 4 are rejected under 35 U.S.C. 103(a) as being obvious over Gevargiz et al. (US Patent 6,301,313) in view of Werner et al. (US Patent 6,493,381).

(1) With regard to claim 4, Gevargiz et al. discloses an apparatus for receiving a radio frequency (RF) signal comprising: at least one antenna for receiving the RF signal; at least one tuner for selecting the RF signal from a desired frequency band; an equalizer (col. 1, lines 23-30, col. 4, line 38).

However Gevargiz et al. does not disclose an equalizer having a plurality of tap weights; and a modified constant modulus algorithm (M-CMA) circuit for adjusting said plurality of tap weights.

However Werner et al. discloses an equalizer having a plurality of tap weights; and a modified constant modulus algorithm (M-CMA) circuit for adjusting said plurality of tap weights (abstract, col. 4, lines 10-39, col. 6, lines 20-67 – col. 7, lines 1-6)

Therefore it would have been obvious to one of ordinary skill in the art to modify Gevargiz et al. in view of Werner et al. to incorporate an equalizer having a plurality of tap weights; and a modified constant modulus algorithm (M-CMA) circuit in order to reduce the rate of occurrence of a diagonal solution (Werner et al., col. 5, lines 15-31).

6. Claims 5, 6, 9, 10, 12 are rejected under 35 U.S.C. 103(a) as being obvious over Gevargiz et al. (US Patent 6,301,313), as applied to claims 1, 3 and 4, in view of Werner et al. (US Patent 6,493,381), in further view of Smee et al. (US Patent 6,400,761)

(1) With regard to claim 5, claim 5 inherits all the limitations of claim 4. However Gevargiz et al. in combination with Werner et al. do not disclose a plurality feed forward equalizers, where each FFE is coupled to an antenna; a combiner or combining the output signals from each of said plurality of feed forward equalizers to form a combined signal; a carrier/slicer circuit for extracting the carrier from the combined signal and generating a symbol error signal; and a decision feedback equalizer for suppressing inter-symbol interference in said combined signal; adjusting the tap weights of said plurality of feedforward equalizers and said decision feedback equalizer.

However Smee et al. discloses in (Fig. 2B) a plurality feed forward equalizers(30), where each FFE is coupled to an antenna; a combiner (34) or combining the output signals from each of said plurality of feed forward equalizers to form a combined signal; a carrier/slicer circuit (36) for extracting the carrier from the combined signal and generating a symbol error signal; and a decision feedback equalizer (38) for suppressing inter-symbol interference in said combined signal; adjusting the tap weights of said plurality of feedforward equalizers and said decision feedback equalizer (abstract).

Therefore it would have been obvious to one of ordinary skill in the art to modify the inventions of Gevargiz et al. in combination with Werner et al. in view of Smee et al.

to incorporate a plurality feed forward equalizers, where each FFE is coupled to an antenna; a combiner or combining the output signals from each of said plurality of feed forward equalizers to form a combined signal; a carrier/slicer circuit for extracting the carrier from the combined signal and generating a symbol error signal; and a decision feedback equalizer for suppressing inter-symbol interference in said combined signal; adjusting the tap weights of said plurality of feedforward equalizers and said decision feedback equalizer in order to reduce the rate of occurrence of a diagonal solution.

(2) With regard to claim 6, claim 6 inherits all the limitations of claims 4 and 1.

(3) With regard to claim 9, see rejection of claims 4 and 5.

(4) With regard to claim 10, claim 10 inherits all the limitations of claim 9. See rejection of claim 6.

(5) With regard to claim 12, claim 12 inherits all the limitations of claim 10. See rejection of claim 3.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being obvious over Gevargiz et al. (US Patent 6,301,313) in view of Werner et al. (US Patent 6,493,381) as applied to claim 6, in further view of Shen (US Patent 5,416,845).

With regard to claim 8, claim 8 inherits all the limitations of claim 6. Gevargiz et al. in view of Garth disclose all the limitations of claim 6 above. However Gevargiz et al. in view of Garth do not disclose wherein said gradient recursion algorithm is defined by the equation w.sub.k+1=w.sub.k-.mu..sub.m.gradient.J.sub.m(w).-vertline.w=w.sub.k, where: w.sub.k+1 is a tap weight vector at the kth+1 instant, w.sub.k

is said tap weight vector at the kth instant, .mu..sub.m is the gradient step size, and .gradient.J.sub.m(w) is the gradient of said cost function.

However Shen discloses wherein said gradient recursion algorithm is defined by the equation w.sub.k+1=w.sub.k-.mu..sub.m.gradient.J.sub.m(w).- vertline.w=w.sub.k, where: w.sub.k+1 is a tap weight vector at the kth+1 instant, w.sub.k is said tap weight vector at the kth instant, .mu..sub.m is the gradient step size, and .gradient.J.sub.m(w) is the gradient of said cost function (col. 2, lines 29-44, col. 4, lines 1-40).

Therefore it would have been obvious to one of ordinary skill in the art to modify Gevargiz et al. in view of Garth in further of Shen to incorporate wherein said gradient recursion algorithm is defined by the equation w.sub.k+1=w.sub.k-.mu..sub.m.gradient.J.sub.m(w).- vertline.w=w.sub.k, where: w.sub.k+1 is a tap weight vector at the kth+1 instant, w.sub.k is said tap weight vector at the kth instant, .mu..sub.m is the gradient step size, and .gradient.J.sub.m(w) is the gradient of said cost function for rapid convergence to ensure short adaptive responses to transient noises (Shen, col. 3, lines 29-31).

Allowable Subject Matter

8. Claims 2, 7, 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: The instant application discloses a method of equalizing a radio frequency signal. Prior art references show similar methods but fail to

teach: **"wherein said cost function is defined by the equation 9 J m (w) = E [(z k 2 - A) 2 + [cos 2 (z kr 2 d) + cos 2 (z ki 2 d)]] ,where: w is a tap weight vector, z.sub.k is the output of the equalizer after the kth iteration, A is the desired amplitude in the absence of interference, z.sub.kr and z.sub.ki are the real and imaginary parts of z.sub.k, respectively, and .beta. is a weighting factor"**, as in claims 2, 7, 11.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 571-272-3047. The examiner can normally be reached on Monday – Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Cicely Ware

cqw
September 26, 2005

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600